Hospital Standardised Mortality Ratio (HSMR):

Updating Methodology for Covid-19

Situation

On 1 March 2020, the first person in Scotland tested positive for COVID-19. On the 17 March NHS Scotland was placed on an emergency footing by the Cabinet Secretary.

Since the start of the outbreak, Public Health Scotland (PHS) has been working closely with the Scottish Government and health and care colleagues to support the surveillance and monitoring of COVID-19 amongst the population. There is a large amount of data being regularly published regarding COVID-19 (for example, PHS weekly reports, including wider impacts analysis; Coronavirus in Scotland – Scottish Government and Deaths involving coronavirus in Scotland – National Records of Scotland).

The Hospital Standardised Mortality Ratio (HSMR) continues to be published quarterly. We are expecting to see a significant amount of activity relating to COVID-19 within the SMR01 database from March 2020, which will be included within the August 2020 HSMR publication onwards. This document describes how we have updated the HSMR methodology to include these cases.

Background

Hospital mortality measures have an important role to play in stimulating reflection on the quality and safety of patient care. PHS (formerly ISD) has produced quarterly HSMRs for hospitals since December 2009.

The HSMR methodology used up until May 2019 was agreed in 2015/16. The purpose of the HSMR at that time was to measure change in mortality over time, and to enable acute hospitals to monitor their progress towards the Scottish Patient Safety Programme (SPSP) aim of reducing hospital mortality by a further 10% by December 2018.

The end of this phase of the Scottish Patient Safety Programme provided the opportunity to review the model methodology and subsequently update and refine it, ensuring that the methodology continues to be robust and that comparisons which are made against the national average continue to be appropriate and relevant for each point in time.
The HSMR is based on all acute inpatient and day case patients admitted to all specialties in hospital. The calculation takes account of patients who died within 30 days from admission and includes deaths that occurred in the community as well as those occurring in hospitals.

A dynamic three-year dataset is used to create the model. The three-year period used for the dataset is advanced by three months with each reporting period.

Please refer to the HSMR Technical Document for further information.

Assessment

During the pandemic hospitals have been required to adjust their normal ways of working to react to this healthcare emergency at a local level. As such there will be significant changes in the volumes of activity in some of the case-mix groups used to calculate the predicted mortality within HSMR, for example reductions in elective admissions. In addition, some hospitals, and NHS Health Boards may also see more activity than others.

Whilst we believe the HSMR model methodology to be robust enough to calculate predicted probabilities of death for the changing case-mix during this period, it is also very important that any changes in unadjusted mortality trends, and higher HSMR mortality ratios are considered in this context.

Recommendation

To allow us to continue to include all diagnoses within the HSMR model, the emergency ICD-10 codes U07.1 to U07.7, assigned by the World Health Organisation in response to the global pandemic, will be included within the primary diagnosis model adjustments. These codes are described in more detail within the Scottish Clinical Coding Standards.

The Scottish HSMR was calculated using 140 primary diagnosis groups (please refer to HSMR Technical Document for further information). From August 2020, this was expanded to 141 groups, with the additional group including ICD10 codes U07.1 and U07.2. From August 2021, ICD10 codes U07.3 to U07.7 were included in this additional group. Whilst consideration was given to including these codes within an existing group, testing showed that model fit was marginally improved by having them in a separate group. This will also allow us to isolate them for further analysis in the future.
This is the only adjustment made to the model at this time. We will continue to review the model methodology routinely to ensure that it continues to be robust and that comparisons which are made against the national average continue to be appropriate and relevant.